NON-PUBLIC?: N
ACCESSION #: 9412120282
LICENSEE EVENT REPORT (LER)

FACILITY NAME: Nine Mile Point Unit 1 PAGE: 1 OF 7

DOCKET NUMBER: 05000220

TITLE: Automatic Reactor Scram on High Neutron Flux Signal
Caused by Inadequate Work Practices During Surveillance
Testing
EVENT DATE: 11/02/94 LER #: 94-007-00 REPORT DATE: 12/02/94

OTHER FACILITIES INVOLVED: DOCKET NO: 05000

OPERATING MODE: N POWER LEVEL: 078

THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR SECTION:
50.73(a)(2)(iv)

LICENSEE CONTACT FOR THIS LER:
NAME: Mr. John C. Aldrich, Maintenance TELEPHONE: (315) 349-4182
Manager

COMPONENT FAILURE DESCRIPTION:
CAUSE: X SYSTEM: IG COMPONENT: NA MANUFACTURER: 6080
REPORTABLE NPRDS: N

SUPPLEMENTAL REPORT EXPECTED: NO

ABSTRACT:

On November 2, 1994 at 1004 hours, Nine Mile Point Unit 1 (NMP1) received a full automatic reactor scram initiation signal. Specifically, while performing a scheduled surveillance test on the Average Power Range Monitor (APRM) Flow Converters, a high neutron flux trip signal was inadvertently initiated on Reactor Protection System (RPS) Channel 12 while a manual one-half scram signal was inserted on RPS Channel 11. Additionally, High Pressure Coolant Injection (HPCI) initiated on low reactor water level.

The root cause of the event is failure of the Instrument and Control (I&C) technicians to use good work practices while implementing the self-checking and peer verification processes. A contributing factor was that the flow converter panel was not labeled with the RPS channel

designation. Additionally, two weaknesses were identified. First, Control Room Operations oversight of this critical activity was inadequate because Management's expectations did not require the appropriate level of oversight. Second, the sequence of steps in the surveillance procedure for inserting one-half scrams was not adequate.

The technicians involved were counseled. I&C technicians were retrained in the self-checking and peer verification processes. The flow converter panels have been labeled with the RPS channel identification. Operations Management will develop new expectations for control room Operations personnel with respect to oversight of critical activities. Procedu
es
have been revised regarding inserting one-half scrams during certain surveillances. A Rod Position Indication System probe buffer card has been replaced.

END OF ABSTRACT

I. DESCRIPTION OF EVENT

On November 2, 1994 at 1004 hours, Nine Mile Point Unit 1 (NMP1) received a full automatic reactor scram initiation signal. Specifically, while performing a scheduled surveillance test on the Average Power Range Monitor (APRM) Flow Converters, a high neutron flux trip signal was inadvertently initiated on Reactor Protection System (RPS) Channel 12 while a manual one-half scram signal was inserted on RPS Channel 11. Additionally, High Pressure Coolant Injection (HPCI) initiated on low reactor water level. At the time of the event, NMP1 was operating at approximately 78 percent rated thermal power with reactor pressure at 980 psig. There were no structures, systems or components that were inoperable at the start of the event that contributed to the event.

At the time of the scram, an Instrument and Control (I&C) lead technician was performing surveillance procedure N1-ISP-032-008, "Reactor Recirculation Flow Loop Calibration," on APRM flow converters. The flow converters receive input signals from flow transmitters located in each reactor recirculation loop and provide a flow signal to the APRMs for flow biasing. Per the surveillance procedure, the Chief Shift Operator manually inserted a one-half scram in RPS Channel 11. A few procedure steps later, the I&C lead technician was to place the RPS Channel 11 APRM flow converter function switch to the "zero" position. He erroneously proceeded to Channel 12 and placed the corresponding switch to the "zero" position. This action simulated zero flow in Channel 12. When the flow signal was removed from the RPS Channel 12 APRMs, a flow-biased high

neutron flux trip signal was generated by these APRMs. This caused an automatic one-half scram in RPS Channel 12 and, concurrent with the manual one-half scram in RPS Channel 11, brought in a full scram.

Following the scram, all control rods were verified to have fully inserted using the full core display's position indication and/or green background light for fully inserted rods. Two control rods, "18-45" and "22-07," inserted beyond position "00" as indicated by a green background light and no position indication. Additionally, the rod block monitor's "one rod permit" light was lit and the auxiliary control room's (and also the remote shutdown panel's) "all rods in" lights were not lit, conflicting with the full core display. Thus, these conflicting indications could not be used as redundant indication that all control rods were fully inserted.

Following the scram, reactor water level decreased to +19 inches scale (which is 103 inches above the top of active fuel) as expected. The turbine tripped after the automatic reactor scram and powerboards 11 and 12, normally supplied by station service, fast transferred to offsite power, as designed. HPCI initiated on low reactor water level, and started electric motor driven Feedwater Pumps (FWP) 11 and 12 in the HPCI mode. The starting of both pumps in conjunction with the coastdown of the main turbine shaft driven FWP 13 caused FWPs 11 and 12 to receive low suction pressure alarms, and FWP 12 tripped on low suction pressure, as expected. FWPs 11 and 13 recovered reactor water level to +97 inches scale. By design, when reactor water high level is reached (at +95 inches scale), the electric motor driven

I. DESCRIPTION OF EVENT (cont.)

FWPs will trip if the flow control valves (FCVs) are not fully closed after a 10 second time delay, to prevent flooding of the main steam lines. During this event, ten seconds after the high reactor water level was reached, FWP 12 received a second trip signal, indicating that its FCVs were not fully shut. After resetting HPCI, FWP 11 tripped on high reactor water level, indicating that its FCVs were not fully shut.

The reactor scram was reset and normal reactor vessel water level was re-established. All other reactor parameters exhibited a normal response during the scram.

II. CAUSE OF EVENT

The root cause of this event is failure of the I&C technicians to use

good work practices. The technicians did not correctly self-check their actions and did not correctly use the peer verification process. These processes are established as standards in the "Maintenance Department Performance Principles." The I&C lead technician erroneously selected the RPS Channel 12 APRM flow converter function switch and did not prevent this error by self-checking. The peer verifier observed the selection of the flow converter function switch and mentally questioned whether the wrong channel was selected. While the peer evaluator was looking for a confirming label, the function switch was taken to the "zero" position by the lead technician, causing this event. The peer verifier did not act aggressively to prevent the inappropriate action and did not actively participate by providing permission to complete the procedure step. A factor contributing to the technician errors was that the flow converter panel was not labeled with the RPS channel designation.

Additionally, two (2) weaknesses were identified as a result of this event. First, Operations oversight of this critical activity was inadequate because Management's expectations did not require the appropriate level of oversight. Second, the surveillance procedure was inadequate in that it first called for the insertion of a manual one-half scram by the operator at the control panel, then for the insertion of the flow converter trip (which also results in a one-half scram signal) from behind the panel by the technician. With this methodology, the technician cannot observe the existent RPS conditions, and is not within sight of the control room operator.

III. ANALYSIS OF EVENT

This event is reportable in accordance with 10CFR50.73 (a)(2)(iv), "any event or condition that resulted in manual or automatic actuation of any Engineered Safety Feature (ESF), including the Reactor Protection System (RPS)."

III. ANALYSIS OF EVENT (cont.)

The flow-biased APRM scram is an automatic Reactor Protection System (RPS) action to prevent exceeding a fuel cladding safety limit. The integrity of the fuel clad as a barrier to the release of fission products is assured if a safety limit is not exceeded. In this event, actual neutron flux levels did not increase.

The safety significance of incorrect indications from the rod block monitor's "one rod permit" light and the auxiliary control room's/remote shutdown panel's "all rods in" light is minimal. In the control room, the

full core display and the process computer are available to indicate control rod positions following a scram. If operators were forced to evacuate the control room, such as in the event of a control room fire, they would scram the reactor and attempt to determine that all rods are in before evacuating, in accordance with their procedures and the training they have received. Thus, they would not have to rely only on the remote shutdown panel's "all rods in" light.

The High Pressure Coolant Injection (HPCI) System is an operating mode of the Feedwater System. The initiation of the HPCI System on low reactor water level is a design function to provide adequate cooling to the reactor core. Coastdown of the main turbine driven FWP and operation of HPCI recovered reactor water level.

Post-event troubleshooting of the feedwater pumps determined that both FWP 11 and FWP 12 tripped after the reactor water high level was reached because their flow control valves were not fully closed. Neither pump was in the HPCI mode at the time. The pumps tripped as designed. The intent of these trips is to prevent overfilling the reactor vessel and flooding of the main stream lines. If a low reactor water level subsequently occurred, both pumps would have been available to start in the HPCI mode because flow control valve position does not inhibit a HPCI start.

There were no adverse safety consequences as a result of this event, nor was the reactor in an unsafe condition during or after this event. There were no adverse consequences to the health and safety of the general public or plant personnel as a result of this event.

IV. CORRECTIVE ACTIONS

The immediate corrective actions were to perform all scram recovery actions, place the plant in a stable condition, and determine the cause of the scram. Also, a Deviation Event Report (DER No. 1-94-2215) was written to evaluate the event.

IV. CORRECTIVE ACTIONS (cont.)

Corrective actions to address the cause of the scram and identified weaknesses are:

1. Job performance counseling with respect to self-checking and peer verification was given to the I&C technicians involved in this event.

2. I&C management conducted a special training session for I&C technicians with respect to self-checking and peer verification. The training was conducted on the plant reference simulator and was taught by the technicians involved in this event. The technicians explained their errors and the correct methods for performing self-checking and peer verification.

3. The APRM flow converter panels have been labeled with the RPS channel identification.

4. Operations management will develop new expectations for Operations personnel with respect to oversight of activities that are critical in nature, such as those resulting in initiation of one-half scram and one-half isolation signals, and others which may have an impact on plant operation. Operations management will train the operating crews on these expectations during requalification training by January 31, 1995. In the interim, initial expectations were conveyed to operating crews via shift supervisor instructions.!

5. Procedures N1-ISP-032-008 and N1-ISP-032-004 ("Reactor Recirculation Flow Converter Calibration") have been revised to require the insertion of the flow converter trip one-half scrams from behind the control room panel before the manual one-half scrams are inserted from the control room panel.

6. Operations, Maintenance, Chemistry, and Radiation Protection personnel will be required to verify that equipment identification in procedures accurately reflect plant components. Prior to conducting critical procedures, adequacy of the plant component labeling will be determined and corrected, if necessary. The procedures will likewise be updated prior to use to ensure that the identifiers in the procedures match the plant identification labels. This will be completed by December 1996 commens rate with the future use of all the critical procedures in the upcoming two-year cycle.

7. Operations, Maintenance, Chemistry and Radiation Protection personnel will be trained, by January 31, 1995, on the lessons learned from this event with respect to self-checking and peer verification.

IV. CORRECTIVE ACTIONS (cont.)

Corrective actions to address equipment problems observed during the

scram are:

1. Troubleshooting was performed on the rod block monitor's "one rod permit" light and the auxiliary control room's "all rods in" light. Control rod 10-39 was inserted to jog the position indication switches, which corrected the problem. However, subsequent troubleshooting determined that the green background light for control rod 10-39 would not extinguish when the rod was withdrawn. Control rod 10-39's probe buffer card was replaced and the rod exercised to ensure the green background light would clear when the rod was not fully inserted. A transistor on the probe buffer card had failed.

2. Post-event troubleshooting was performed on FWP 12 and determined that both FCVs were not fully closed when a normal close signal was applied to their respective positioners and actuators. The actuators and positioners were calibrated and adjusted to the correct settings. The position limit switches were also checked and adjusted to their correct settings.

3. Post-event troubleshooting determined that FWP 11's manual/automatic flow controller most likely was sending a small manual open signal to the FCVs, causing them to be slightly open. Since the pump did not trip in the HPCI mode, immediate corrective actions were not necessary. However, based on the evaluation of the pump trip, the design requirements for the FCV limit switches will be evaluated. Additionally, better direction will be sought to provide to operators to ensure that the FCVs are fully closed before resetting HPCI.

V. ADDITIONAL INFORMATION

A. Failed component:

Q16 Transistor on General Electric's control rod drive probe buffer card (GE part IE 136B1444G001) for the Rod Position Indication System

B. Previous similar events:

NMP1 has experienced previous similar events caused by failure to use good work practices:

LER 93-02 "Automatic Reactor Scram on High Neutron Flux Signal Received During Surveillance Testing due to Personnel Error," describes an event similar to the current event.

A common cause between these two

V. ADDITIONAL INFORMATION (cont.)

events is that inadequate self-checking was a cause in both. As a result of LER 93-02's event, Maintenance wrote the "Maintenance Department Performance Principles" and trained personnel in the self-checking and peer verification processes. Had the technicians performed the current calibration in accordance with the self-checking and peer verification training they received, the current event could have been prevented.

LER 90-26 "Reactor Scram During Surveillance Test due to Personnel Error," describes a reactor scram caused by main steam isolation valve isolation, when an operator removed an incorrect fuse during a surveillance procedure. The primary cause of this event was poor work practices, specifically failure to self-verify the correct component. The corrective actions from this LER would not have prevented the current event.

C. Identification of components referred to in this LER:

COMPONENT IEEE 803 EIIS FUNCTION IEEE 805 SYSTEM ID

Reactor Protection System N/A JC
Feedwater System N/A SJ
High Pressure Coolant Injection System N/A BJ
Reactor Recirculation System N/A AD
Reactor Pressure Vessel RPV SD
Pump P AD, SJ
Neutron Monitor MON IG
Flow Converter CNV AD
Average Power Range Monitor MON IG
Main Turbine TRB TA
Flow Transmitters FT AD
Control Rods ROD AA
Flow Control Valves FCV SJ
Rod Position Indication System NA IG

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Plant Manager - Unit #1 December 2, 1994
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U. S. Nuclear Regulatory Commission
Attn: Document Control Desk
Washington, DC 20555

RE: Docket No. 50-220
LER 94-07

Gentlemen:

In accordance with 10CFR50.73 (a)(2)(iv), we are submitting LER 94-07, "Automatic Reactor Scram on High Neutron Flux Signal Caused by Inadequate Work Practices During Surveillance Testing."

A telephone report of this event was made in accordance with 10CFR50.72 (b)(2)(ii) at 1120 hours on November 2, 1994.

Very truly yours,

R. B. Abbott
Plant Manager - NMP1

RBA/JTP/lmc
Attachment

xc: Mr. Thomas T. Martin, Regional Administrator, Region I
Mr. Barry S. Norris, Senior Resident Inspector

*** END OF DOCUMENT ***